

Hanford Geophysical Logging Project

Health and Safety Plan

November 2005



GJO-HGLP 1.6.4
Revision 1

Copy # _____

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Health and Safety Plan

November 2005

Prepared for
U.S. Department of Energy
Office of Environmental Management
Grand Junction, Colorado

Prepared by
S.M. Stoller Corporation
Grand Junction Office
Grand Junction, Colorado

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Hanford Geophysical Logging Project Health and Safety Plan

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1.0 Introduction

1.1 Background

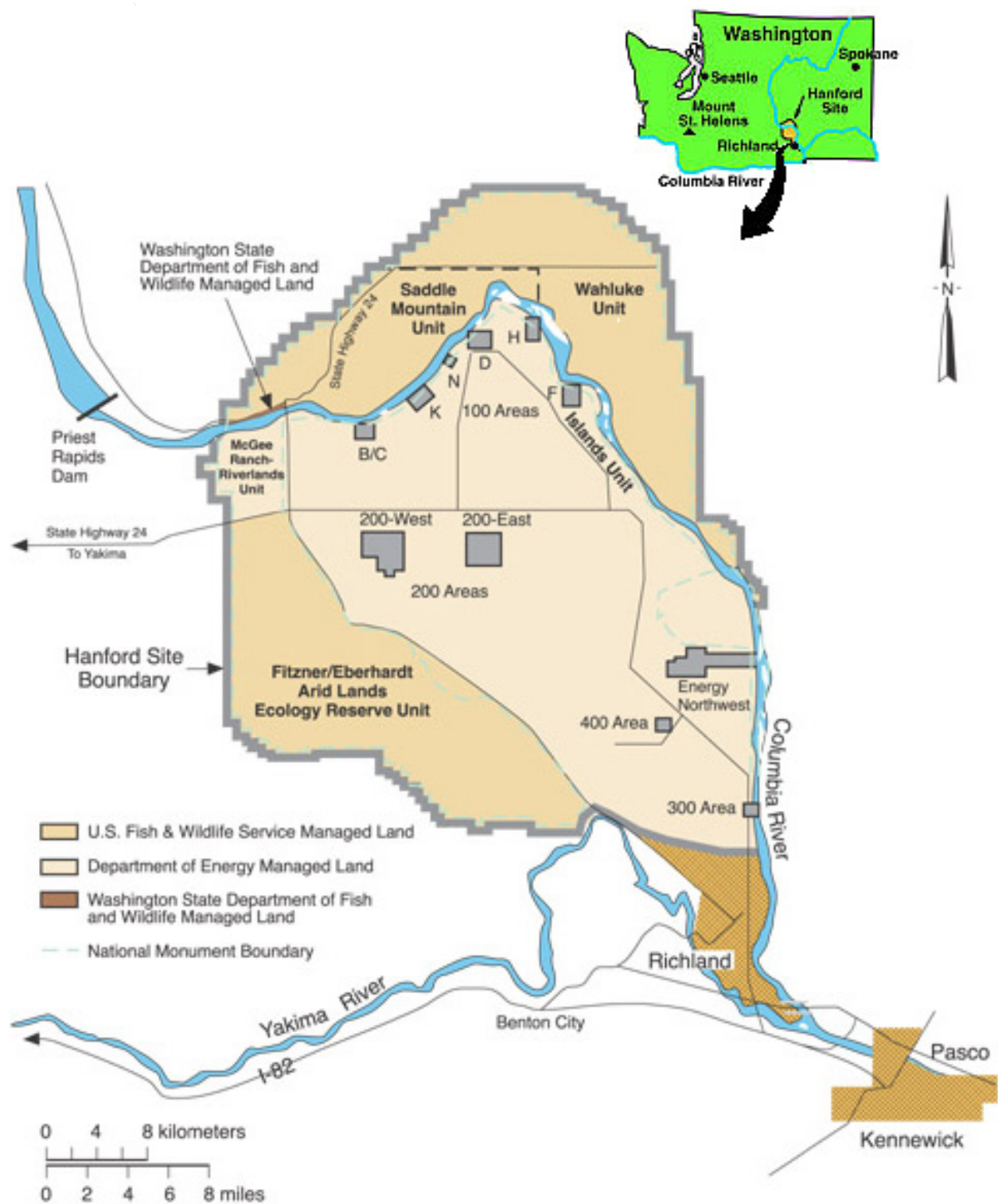
The U.S. Department of Energy Richland Operations Office (DOE-RL) has tasked the DOE Grand Junction Office (GJO) and its prime contractor, S.M. Stoller Corporation (Stoller), with borehole geophysical logging at the Hanford Site near Richland, Washington. This health and safety plan (HASP) has been prepared and issued by Stoller. Throughout this HASP, Stoller will be referred to as the GJO contractor.

1.2 Site Description

The Hanford Site occupies approximately 1,450 square kilometers (km²) (560 square miles [mi²]) within the semi-arid Pasco Basin of the Columbia Plateau in south-central Washington State (Figure 1-1). This area is under restricted public access and provides a buffer for the smaller fenced operational areas currently used for storage of nuclear materials, waste storage, and waste disposal. The Hanford Site was established in 1943 to produce plutonium in support of the U.S. nuclear weapons program. Uranium metal was fabricated in the 300 Area into jacketed fuel elements. The fuel elements were used to run reactors, located near the river in the 100 Areas, for plutonium production. Irradiated fuel elements were processed in the 200 Areas to recover plutonium and uranium. High-level wastes, including activation and fission products were stored in underground tank farms. Low- and intermediate-level waste streams were frequently discharged to ponds, cribs, and ditches in the 200 Areas.

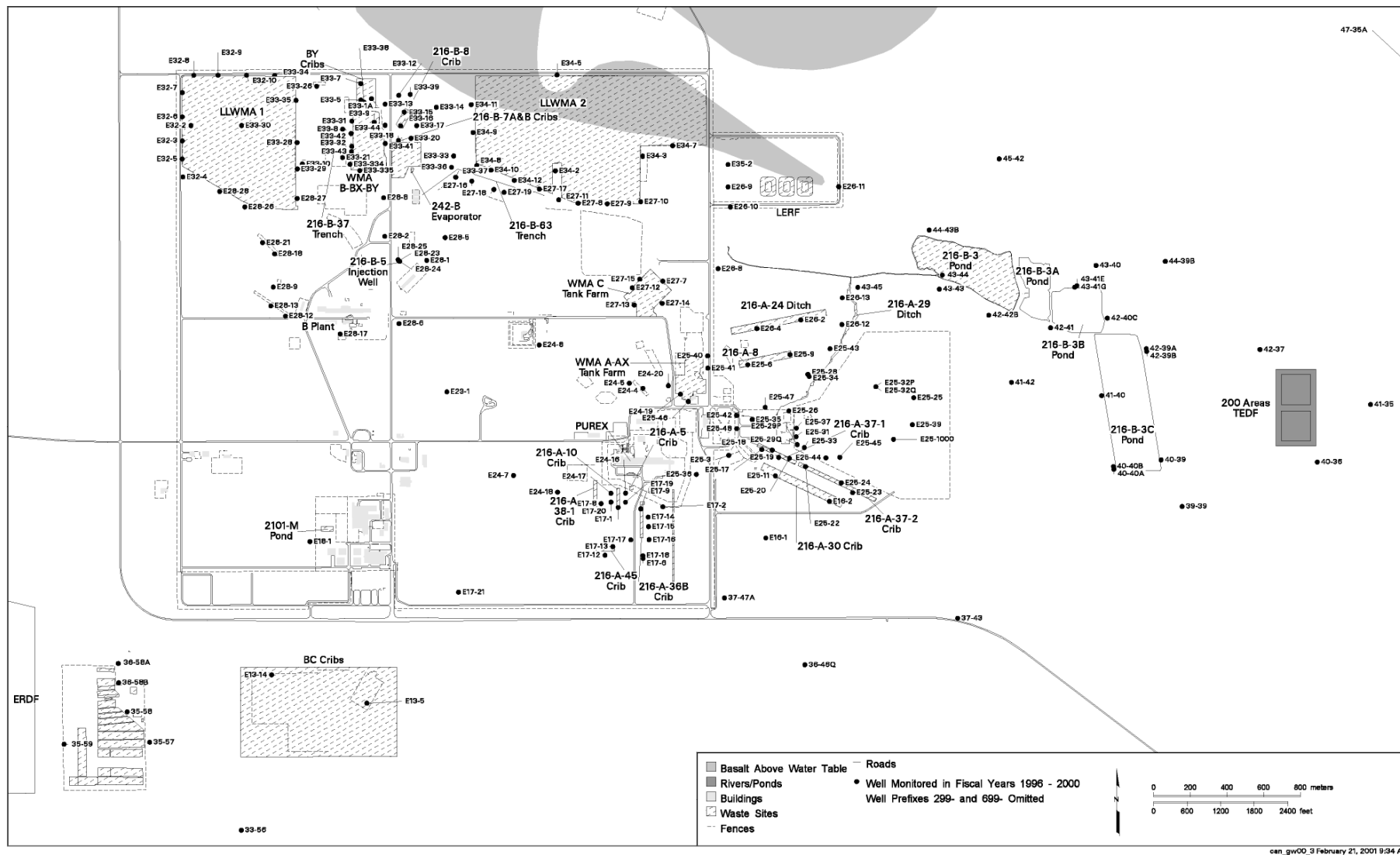
The 200 Areas are located on a broad plateau at the approximate center of the Hanford Site. Chemical separation plants were located in both the 200 East and 200 West Areas (Figures 1-2 and 1-3). With the startup and operation of the separation plants, large quantities of wastes were generated. High-level radioactive wastes were neutralized and stored in underground tanks. Liquid wastes (primarily water) containing minor concentrations of radionuclides and chemicals were discharged to the soil column via surface ponds, ditches, cribs, reverse wells, and French drains. These facilities were generally located in the 200 Areas and in the surrounding 600 Area.

The majority of the geophysical logging will be performed at or near waste sites located in the 200 Areas. Logging may be performed at other sites (e.g., 100, 300 and 600 Areas) across the entire Hanford Site as needed.



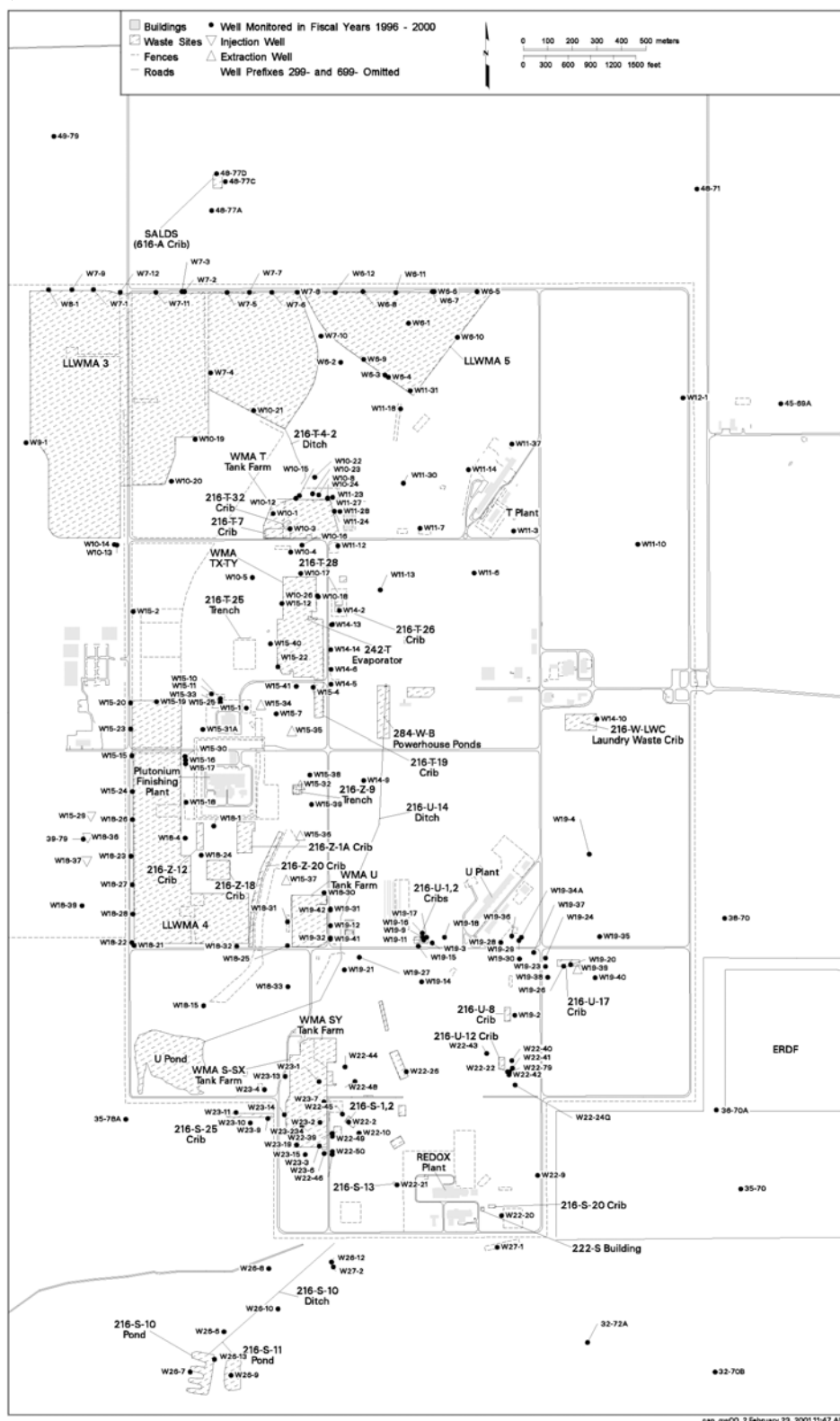
From PNNL (2004)

Figure 1-1. Location Map for the Hanford Site and 200 Areas



From PNNL (2001)

Figure 1-2. Location Map for the 200 East Area Waste Disposal Sites



From PNNL (2001)

Figure 1-3. Location Map for the 200 West Area Waste Disposal Sites

1.3 Scope of Work

Several logging systems have been developed by DOE-GJO for logging at the Hanford Site. The Spectral Gamma Logging System (SGLS) utilizes a high-purity germanium (HPGe) semiconductor detector with a relatively efficiency of approximately 35%. This detector is capable of quantifying gamma-emitting radionuclides from background levels to several thousand picocuries per gram (pCi/g). A second system, the High Rate Logging System (HRLS) has been specifically developed for use in zones of high gamma flux. With shielding, this system is capable of measurements of up to several hundred million picocuries per gram. A third system developed at Hanford utilizes a neutron moisture probe configured as a logging sonde to measure moisture in the vadose zone.

Any and/or all of these systems may be used to support various projects across the Hanford Site. Their primary use, however, will be for the baseline characterization of the liquid effluent sites located on the 200 Area plateau.

1.4 Scope of Health and Safety Plan

This HASP describes the hazards and the overall health and safety requirements for GJO contractor personnel operating geophysical logging equipment on the Hanford Site. Activities will be conducted under the controls contained in site-specific HASPs, approved Hanford Site Contractor (HSC) health and safety procedures, 29 CFR 1910, "Occupational Safety and Health Standards," 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," and 29 CFR 1926, "Safety and Health Regulations for Construction."

The HASP addresses the hazards and health and safety requirements related to the safe operation of the geophysical logging equipment. The use of this equipment at each of the well locations is the responsibility of the GJO contractor personnel. The access requirements of the well to be studied, including access, opening, monitoring, securing, etc., is also under the jurisdiction of the Hanford Site Contractor (HSC) Safety Manager. The GJO contractor personnel will work in full compliance of the Hanford Site HASP as it applies to the access and operational requirements for the well site being logged.

1.5 Health and Safety Plan Page Changes

The information in this HASP will be maintained current with conditions at the work site. Changes to this HASP will be completed according to the *GJO Health and Safety Manual*, GJO 2 (Stoller 2002a). A document revision will be issued to amend the information or requirements in this HASP. The document will be reviewed and updated on at least a 12-month time frame and will be in compliance with 29 CFR 1910.120(b)(4)(iv). No other mechanisms (pen and ink line outs, Program Directives, etc.) are authorized for use in amending the information or requirements of this HASP.

1.6 Records

The GJO contractor forms referenced throughout this HASP are to be completed as necessary to record completion of training, medical surveillance, occurrence reporting, and other requirements. HSC forms will be used as necessary.

The Project Manager will make the determination to acquire specific records generated by non-GJO contractor individuals or organizations in support of GJO contractor work. This may include records generated or maintained by non-GJO contractor individuals or organizations for GJO contractor employees (e.g., Health and Safety records). Transfer of these records from non-GJO contractor subcontractors will be according to the project working file index. The Project Manager will identify records critical to the project, and copies of these records will be made available through the appropriate HSC. The GJO contractor may accept original records or record copies from non-GJO contractor sources. In either case, records will be evaluated before acceptance to the central file station.

2.0 Key Personnel

2.1 Organizational Structure

Table 2-1 provides a listing of DOE, GJO contractor, and HSC personnel that support or will implement the Hanford Geophysical Logging Project.

Table 2-1. Project Management and Support Personnel

POSITION	NAME	PHONE EXT.
Stoller Task Order Manager, GJO	Mike Butherus	(970) 248-6332
Project Manager, GJO	Brian Mathis	(509) 376-6465
Project Coordinator, Hanford	Alan Pearson	(509) 376-6440 (509) 531-1246 (cell)
Technical Lead, Hanford	Rick McCain	(509) 376-6435
Technical Lead, GJO	Carl Koizumi	(970) 248-7797
Office Administrator, Hanford	Trina Guthrie	(509) 376-6454
Health and Safety Manager, GJO	Michael Hurshman	(970) 248-6468
Fluor Hanford, Inc. Hanford Site Health & Safety	Andy Foster or Matt Call	(509) 376-4313 (509) 845-4719 (cell) or (509) 373-2477 (509) 551-8077 (cell)
DOE-GJO Site Manager/TOM	Joel Berwick	(970) 248-6020
DOE-RL Program Manager/TOM	John Morse	(509) 376-0057

2.2 Project Manager

The Project Manager has the responsibility for ensuring the overall Hanford Geophysical Logging Project complies with this HASP. Further responsibilities are to ensure the applicable health and safety and medical records are formally transferred from the HSC to Stoller.

2.3 Project Coordinator

The Project Coordinator is responsible and accountable for ensuring that day-to-day activities comply with the requirements of this HASP. If any circumstances arise with the potential for the health and safety of any project personnel to be jeopardized, the Project Coordinator has the authority and responsibility to halt work until the situation can be adequately addressed.

In addition, the Project Coordinator is responsible for conducting pre-entry briefings and routine safety meetings (see Section 4.3). He or she will ensure the *GJO Health and Safety Manual*, GJO 2 (Stoller 2002a), *Fluor Hanford Safety and Health Policy* (HNF-5053), and this HASP are available in the GJO logging truck.

2.4 Office Administrator

The Stoller Hanford Office Administrator will serve as the training records contact with HSC Training Records.

2.5 Health and Safety

Stoller is responsible for ensuring close coordination between the facility and the organization for the purpose of maintaining a safe and healthful workplace. Other responsibilities include developing and implementing any applicable HASPs and auditing field activities, as appropriate, to verify compliance;; and supporting the line organization in dealing with hazards and establishing safety and health requirements.

The Stoller Safety Representative is responsible for assisting management in defining, monitoring, and resolving safety and health issues; aiding in the evaluation and communication of hazards to employees; and verifying compliance with applicable HASPs and health and safety procedures and requirements.

The HSC Occupational Safety and Health (OS&H) organization will aid and assist the Stoller Safety Representative to ensure OS&H regulations and requirements are effectively implemented.

All personnel will follow the safety requirements contained in this HASP, any applicable site-specific HASPs, and the *Project Hanford Radiological Control Manual* (HNF-5173). It is each individual's responsibility to actively pursue safe work practices for their own safety and for their co-workers.

2.6 Hanford Site Contractor Health and Safety Personnel

2.6.1 Fluor Safety and Health Technical Support

HSC OS&H will monitor the safety and health performance of the Stoller work activities in an

effort to assist the Stoller Safety Representative in ensuring compliance to the applicable requirements and regulations. The HSC OS&H organization will also provide industrial hygiene technical support. Industrial hygiene support will include establishing exposure controls and limits, and conducting sampling and monitoring for hazardous agents for all activities and evolutions. This monitoring will be done at the discretion of HSC OS&H to ensure compliance with the standing automated job hazards analysis (AJHA) for work on monitoring wells. Results of all industrial hygiene surveys and monitoring will be provided to Stoller management.

As necessary, radiological and chemical exposure monitoring will be performed by the HSC.

2.6.2 Hanford Site Contractor Radiological Control

All work performed will be in accordance to the most current version of the FH's *Radiation Protection Program* (HNF-SP-1145) and the PHMC Radiological Control Manual (HNF-5173). The HSC Radiological Control organization (RadCon) is responsible for monitoring radiological hazards, providing radiological survey maps to support work planning/performance, verifying compliance with established radiological procedures, and invoking stop work authority for radiological hazards that could potentially jeopardize worker health and safety.

2.6.3 Stop Work Responsibility

It is the policy of the Hanford Site that all employees, regardless of company affiliation, have the responsibility and authority to "stop work" IMMEDIATELY, without fear of reprisal, when they are convinced a situation exists which places themselves, their coworker(s), or the environment in danger.

"Stop work" is defined as stopping the specific task or activity that poses danger to human health and/or the environment.

2.7 Work Elements and Responsibilities

As a means to clearly delineate who is responsible for each of the work elements that represent the scope of the logging, Table 2-2, "Work Elements and Responsible Parties" should be used for referral.

Table 2-2. Work Elements and Responsible Parties

Work Element	Responsible Party - GJO	Responsible Party - FH
Logging Truck:		
Vehicle Movement	x	
Route		x
Site Access	x	x
Operation	x	
Truck Safety	x	
Hoisting and Rigging	x	
Training	x	
Hazard Identification	x	
Safety Meetings	x	
Medical Surveillance	x	
Daily Inspections	x	
Communications	x	
Noise Exposure	x	
Electrical Protection	x	x
MSDS	x	
Exclusion Zone	x	x
Emergency Response	x	x
Spill Containment	x	
Well:		
Access Controls		x
Radiological Control Technician (RCT)		x
Industrial Hygiene (IH)		x
Dosimetry		x
Personal Protective Equipment (PPE) Requirements	x	x
Work Closure	x	
Hazard Identification		x
Decontamination		x
Oversight of Work Site		x

3.0 Hazard Assessment

Hazard assessment is an ongoing process. All personnel engaged in logging activities should maintain a questioning attitude about their personal safety and be aware of their surroundings and ongoing activities. Every attempt has been made to describe the hazards likely to be encountered while performing these activities and their prerequisite controls. Hazards unique to each waste site are addressed in site-specific HASPs and are beyond the scope of this plan. However, should any hazards not previously identified and listed in this HASP and/or in the site-specific HASPs be encountered, the Project Coordinator will ensure appropriate controls are enacted and this plan is amended as necessary.

3.1 Hazards List

The hazards presented in the following sections were identified by reviewing the Activity Hazard Analysis for borehole geophysical logging and from experience gained performing borehole geophysical logging across the Hanford Site.

3.1.1 Operational Hazards

Geophysical logging at the Hanford Site is a non-intrusive activity. A monitoring borehole is uncapped, and a sonde is lowered into the borehole/well from a logging truck. Data collected with the sonde is transmitted to instrumentation in the logging vehicle. The tasks, hazards, and controls associated with the logging operations are presented in Table 3-1.

3.1.2 Radiological Hazards

The radiological conditions present at the various waste sites on the Hanford Site are described in individual Radiological Work Permits (RWPs) and/or site-specific HASPs. These documents will be reviewed prior to initiating work. Personnel will adhere to all controls and procedures presented in the applicable documents.

Individual boreholes will be swabbed and surveyed for internal radiological contamination by HSC RadCon personnel prior to logging. The presence and extent of contamination will dictate the degree of radiological surveillance that will be required during logging in a particular borehole/well.

Logging operations will involve the use of sealed radiological sources. As low as reasonably achievable (ALARA) principles will be followed when handling these sources to ensure worker exposure is kept as low as possible. Personnel will also adhere to the *Hanford Geophysical Logging Project Logging System Operating Procedures* (MAC-HGLP 1.6.5), HSC RadCon procedures, and standard operating procedures when handling these sources.

Table 3-1. Logging Tasks, Hazards, and Controls

Task	Hazard	Control
1. Select and train Logging Engineers.	Logging Engineer medical or physical limitations. Untrained Logging Engineer; failure to perform task.	Examination by occupational physician for suitability to work. Train Logging Engineers or use experienced Logging Engineers; dry run.
2. Opening boreholes.	Biological (spiders, snakes, etc.); chemical.	For biological and chemical hazards, open with caution, visually inspect, additionally, for chemical hazards, stay upwind and let vent; PID monitor for organic vapors; and explosometer monitor for lower explosive limits (LELs).
3. Position sheave, lower/raise detector into dry well.	Pinch points from cable pulleys or reel. Physical weight of probe (approximately 65 pounds).	Keep hands and fingers clear of moving cable. Leather gloves shall be worn when handling cable and as appropriate when using hand tools. Use proper lifting techniques, e.g., use legs instead of back, use two people to lift probe. Use a handling device to lift the probe.
4. Entering and exiting truck.	Trips, slips, and falls.	Use 3-point holds while using stairway. Be cognizant of slipping hazards, e.g., melted snow, and wet stairway treads.
5. Operational check of probe.	Radiation exposure from check source.	Use as low as reasonably achievable practices; time, distance, and shielding. Use proper source storage devices.
6. Use of neutron source.	Radiation exposure from neutron source.	Use as low as reasonably achievable practices; time, distance and shielding; follow approved procedures.
7. Use of liquid nitrogen.	Frostbite or tissue damage.	Wear insulated gloves and face shields, no exposed skin; follow approved procedures.
8. Monitoring of instrumentation	Carbon monoxide exposure (truck is kept running for the duration of the logging activities).	Install a carbon monoxide detector and alarm in the logging truck.

3.1.3 Chemical and Other Hazards

Thorough descriptions of the health hazards and hazardous substances associated with individual waste sites are addressed in site-specific HASPs. The hazards and controls common to all waste sites are presented in Table 3-2.

Table 3-2. Waste Site Common Tasks, Hazards, and Controls

Task	Hazard	Control
1. Select and train Logging Engineers.	Logging Engineer medical or physical limitations. Untrained Logging Engineer; failure to perform task.	Examination by occupational physician for suitability to work. Train Logging Engineers; use experienced Logging Engineers, dry run.
2. Donning PPE.	Spider or snakebite, scorpion or bee sting.	Inspect PPE before donning.
3. Work within a waste site.	Exposure to radiological contamination. Exposure to chemical hazards: Listed in individual site-specific HASPs. Heat stress. Cold stress. Ambient Temp. < 30 °F. Evaluate Chill Temp. < 20 °F.	Wear PPE as prescribed in the applicable radiation work permit (RWP). Wear PPE as prescribed by applicable site-specific HASPs. Provide shade, use work/rest schedule appropriate for in a "light" metabolic rate category as established in the <i>Heat Stress Control</i> , HNF-PRO-121. Drink plenty of fluids (recommended intake is 8 ounces) 20 to 30 minutes before the start of work. Dress appropriately within the guidelines permitted by the RWP. Reference site-specific HASP. Reference site-specific HASP.
4. Decontamination.	Spread of contamination.	Follow procedures as prescribed in HSC Procedures.

Carbon tetrachloride may be encountered in the vadose zone and/or in the groundwater at many waste sites in the 200 West Area, and boreholes in this area may vent carbon tetrachloride vapor to the atmosphere particularly during episodes of low atmospheric pressure. The primary route of worker exposure is inhalation of vapors and absorption through the skin near the borehole. Carbon tetrachloride is a confirmed carcinogen, which targets the central nervous system, eyes, lungs, liver, kidneys, and skin. Symptoms of exposure may include irritation of the eyes and skin, central nervous system depression, nausea, vomiting, dizziness, drowsiness, and injury to the liver and/or kidneys. HSC safety personnel will be contacted for VOCs monitoring, as determined to be necessary, prior to logging boreholes in this area. The exposure limit for airborne concentrations of carbon tetrachloride is 5ppm (ACGIH-TLV). A photoionization detector with an argon lamp (11.8 eV) will be used by the HSC safety personnel for measuring for VOCs. HSC safety personnel will determine the appropriate respiratory protection based on the monitoring results.

4.0 Training

4.1 Employee Participation

GJO contractor employees will not be permitted to participate in or supervise hazardous waste site operations that could expose them to hazardous substances or safety or health hazards until they have been provided training to a level required by their job function and responsibility.

Management and field personnel directly responsible for Hanford operations will complete required training as described in Table 4-1 as appropriate for the areas or facilities in which logging will be performed. Field personnel are responsible for reviewing and being familiar with project plans and procedures applicable to their job function, as directed by management.

4.2 Pre-Entry Briefing

A pre-entry briefing will be conducted by the Project Coordinator and assisted by the HSC, as appropriate. This briefing should include:

- Names of key personnel responsible for site health and safety.
- Safety, health, and other hazards present on the site, as detailed in the standing AJHA.
- The proper uses of personal protective equipment (PPE).
- The approved standard operating procedure (SOP) and emergency response actions.
- The safe uses of engineering controls and equipment on the site.
- The medical surveillance requirements for the site.
- Site access controls.
- A review of the controls contained in the job-specific HASP and any applicable RWPs.

Table 4-1. Training and/or Site Access Requirements

Training Course	Stoller Field Personnel	Stoller Project Coordinator	Stoller Office Personnel
Hanford Site Orientation/General Employee Training (HGET) (000001)	x	x	x
40-hour Hazardous Waste Site Training	x	x	
24-hour On-The-Job Supervised Field Training (031420)	x	x	
Annual Physical	x	x	
Annual Whole Body Count	x	x	
8-hour Manager/Supervisor Hazardous Waste Site Operation Training		x	
8-hour Hazardous Waste Site Refresher (032020)	x	x	
Basic Respiratory Training (02R041)	x	x	
Quantitative Mask Fit (020044)	x	x	
Radiation Worker II (020003)	x	x	
Heat Stress (020193)	x	x	
Hearing Protection (020194)	x	x	
First Aid/CPR	x	x	
Building Emergency Plan Checklist (FEHIC) (WHC IP-0263-TF)	x	x	
Site-Specific Pre-Entry Briefings	x		
Portable Fire Extinguisher Training	x	x	
Commercial Drivers License (well-logging vehicle drivers only)	x	x	
Hazardous Materials General Awareness Training (020075)	x	x	
Intro. to Fed. Motor Carrier Safety Regulations (020083)	x	x	

Occurrence Reporting	x	x	
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4.3 Safety Meetings

Weekly safety meetings will be conducted for the GJO contractor employees by the Project Coordinator. Topics discussed will be recorded on the agenda for the safety meeting, which will be kept on file in the Stoller Office. Discussions will include:

- Health and safety considerations and necessary PPE for the current operations.
- Any revisions to the HASP or to the site-specific HASP.
- All documented and/or observed unsafe acts committed on the site since the previous meeting and methods to prevent recurrence.
- Lessons learned.
- Evacuation routes and staging areas for the specific waste site being logged.

The safety meetings may be conducted whenever starting work at a new waste site or when operational conditions change.

5.0 Personal Protective Equipment

5.1 Personal Protective Equipment Selection Guidelines

The HSC safety personnel will evaluate the hazards identified for individual site access requirements for the logging activities based on the standing AJHA. If engineered safeguards or administrative controls cannot be used, the HSC safety personnel and Project Coordinator will implement the Respiratory Protection Program guidelines for choosing non-radiological respiratory protection to select PPE to protect employees from the known or potential hazards likely to be encountered at the site. HSC RadCon will identify PPE requirements for radiological hazards via the RWP. Where PPE is necessary to address both chemical and radiological concerns, the HSC safety personnel, Project Coordinator, and HSC RadCon will jointly determine requirements.

Employees who are engaged in activities at the Hanford Site that require the use of PPE must meet all applicable training and medical surveillance requirements specified in this HASP, *Personal Protection* (HNF-RD-11183) and the *Project Hanford Site Radiological Control Manual* (HNF-5173).

If the level of PPE for the actual conditions is found to be inadequate after the borehole logging has begun, the Project Coordinator will be notified immediately and all affected activities will be terminated until an evaluation is performed and approval to resume is granted.

PPE will be donned and doffed at the access control point. There will no eating, drinking, smoking, or chewing allowed within the exclusion zone. Under routine operating conditions, the GJO contractor personnel spend the majority of the time in an air-conditioned vehicle as the primary means of heat stress control. The exception is drinking water as a heat stress control measure in accordance with the Heat Stress Program outlined in *Heat Stress Control* (HNF-PRO-121).

The majority of the waste sites are posted as underground radiological hazards, but conditions and postings may vary from site to site. Specific radiological PPE requirements will be contained in the RWP issued by HSC RadCon. The applicable site-specific HASPs will dictate other PPE.

Respiratory protection will be worn as required by the RWP or by HSC safety personnel.

If HSC RadCon prescribes no PPE requirements in the RWP or as specified by the site-specific HASP, then as a minimum, Stoller and all other personnel will wear shirts with sleeves and steel-toed safety work shoes while engaged in well logging activities.

6.0 Temperature Extremes

6.1 Heat Stress

Under routine operating conditions, the GJO contractor personnel spend the majority of the time in an air-conditioned vehicle as the primary means of heat stress control. If the air-conditioned vehicle is not working, all field work will be performed in accordance to the Heat Stress Program outlined in *Heat Stress Control* (HNF-PRO-121) for heat stress protection.

The Project Coordinator is responsible for implementing the requirements and work/rest guidelines established in the heat stress procedure.

6.2 Cold Exposure

Exposure to low temperatures may be a factor if work is performed during the evening hours, if winds are high, if unpredictable weather moves in, or during winter months. Extra care must be exercised while working in cold environments.

Injuries caused by exposure to cold may include frostbite, trench foot, blood vessel abnormalities, and hypothermia. Decreased mental coherence and body movements are signs of hypothermia. If individuals demonstrate evidence of hypothermia or other significant cold injuries (e.g., frostbite), co-workers should immediately notify the Project Coordinator or Stoller Safety Representative.

Normal logging operations will not require employees to be exposed to extreme temperatures for more than 30 minutes at one time. Employees will spend the majority of the workday inside the logging vehicle and/or support vehicle, which are equipped with heaters. The GJO contractor will provide its employees with cold weather gear to protect them from cold temperatures.

The individual employees should consider the following to help protect them from cold exposure:

- Increased fluid intake is essential to ensure proper hydration, which allows adequate blood flow to the extremities.
- A well-balanced diet is important to ensure adequate stores of energy.
- Dress appropriately with layered clothing to create dead air space.
- Wear clothing that allows for moisture to be “wicked away” from the body.
- Protective clothing for the hands, feet, and head are the most important.
- Loose fitting cotton clothing is appropriate.
- Socks with high wool content are best.
- Socks should be changed when wet.
- Use a liner when a hard hat is worn.
- Use a hood/scarf/cap as needed to prevent heat loss from the head.
- Stay dry if at all possible.

6.3 High Wind

Due to the frequent occurrence of high winds in the desert environment at the Hanford Site, appropriate PPE must be readily available. HNF-RD-11183, *Personal Protection*, describes the need for eye and face protection per specifications of ANSI Z87.1, “Practice for Occupational and Education Eye and Face Protection.”

7.0 Medical Surveillance

In most situations, the medical surveillance requirements described in this section will be performed by AdvanceMed Hanford (AMH) or Lourdes¹. The required medical surveillance records generated by AMH or Lourdes will be formally transmitted to the GJO contractor.

7.1 Examinations

Standards and requirements for health assessments of employees and subcontractors are maintained according to DOE orders, 29 CFR 1910.20 Hazardous Waste Site Medical Surveillance, the *GJO Health and Safety Manual*, GJO 2 (Stoller 2002a), and other applicable codes and regulations. Hanford Site forms will be used and approved sample protocols followed during employee and subcontractor medical examinations.

7.1.1 Initial Examinations

The initial examination satisfies two requirements. The first is the provision of baseline data. Subsequent physical examinations may then be compared with the baseline information to suggest physiologic trends. The second requirement is the determination of an individual's fitness for the job, including the ability to work while wearing PPE.

7.1.2 Qualification Physicals

Qualification physicals are required every year. The purpose of this physical is to qualify employees for job assignments with specific medical qualification standards or for medical surveillance. Medical surveillance is instituted for employees who:

- are or may be exposed to hazardous substances or health hazards at or above the personal exposure limit (PEL) for 30 days or more a year,
- wear a respirator for 30 days or more, or
- are injured, become ill, or develop signs or symptoms because of possible overexposure.

Table 7-1 describes the medical surveillance requirements for the GJO contractor personnel working at the Hanford Site.

7.1.3 Exit Physicals

¹ All medical evaluation for Hanford-Site work are performed by AMH

An exit physical is required at termination of employment with the GJO contractor. Content of the exit physical is based upon the time elapsed since the previous physical examination and the potential for exposure to toxic chemicals or hazardous physical agents.

Table 7-1. Medical Surveillance Requirements

Job Description	Initial	Annual Qualification ^a	Respirator	Heavy Metals	Asbestos	Exit Physical
Logging Engineer	x	a	x			x
Geophysicist	x	a	x			x
Project Coordinator	x	a	x			x

^a An annual qualification physical required if the employee meets any of the three criteria listed in Section 7.1.2.

7.2 Injury/Illness Examinations

An injury/illness reexamination will be given if any of the following situations arise:

- An employee notifies the Project Coordinator that he/she has developed signs or symptoms indicating possible overexposure or sensitivity to the hazardous substances or health hazards on the site.
- An employee has been injured or exposed above the PEL or other published exposure levels in an emergency.
- An employee develops a lost-time illness of 3 working days or more.
- An employee sustains any injury.

If an injury/illness is the result of exposure to a hazardous substance or health hazard, the Project Manager, AMH, Lourdes, and the Contractor Health and Safety Manager (GJO) will be notified of the substance or hazards suspected. The AMH or Lourdes physician will specify the scope of the examination. The contract physician will complete a Physician's Recommendation for Return to Work after completion of the reexamination to certify that the employee is fit to return to work and, if necessary, specify any activity restrictions.

7.3 Contract Physician Information

The employee and the GJO contractor will supply the following information to the contracting physician:

- Any data relating to expected or known exposure levels to hazardous or radiological substances.
- A description of PPE expected to be used on work sites.
- A description of employee's duties as they relate to the employee's exposure.
- Any available information from previous medical examinations not readily available to the contract physician.

7.4 Medical Records

Personnel medical and exposure monitoring records will be maintained according to the requirements of 29 CFR 1910.120 and the *General Administrative Procedures Manual* STO-100 (Stoller 2002b), Section 3.0, "Records Management Plan," and this HASP. Employee confidentiality will be maintained to the extent permitted by law. Employees will be notified annually of the following:

- Status/results of medical examinations.
- The right to access medical records anytime.
- Where and how to access medical records.

7.5 Employee Responsibilities

The following responsibilities are applicable to personnel engaged in the Hanford Geophysical Logging Project:

- Report any work-related injury or illness immediately to Stoller line management.²
- It is the responsibility of Stoller management to report any work-related injuries or illnesses to both the FH Field Representative and Single Point of Contact.

² Stoller personnel should report injuries/illnesses to Stoller Management; not AMH, Lourdes, or FH Safety.

8.0 Exposure Monitoring and Well Head Sampling

Radiological and chemical exposure monitoring and sampling for possible VOC emissions at the well head will be performed by HSC OS&H as required. All personnel engaged in borehole logging at the Hanford Site will be issued thermoluminescent dosimeters (TLDs) and neutron dosimetry. Results of personnel exposure monitoring will be formally transmitted to the Richland office of the GJO contractor quarterly. The Richland office will forward any results for GJO-based personnel to the GJO office. GJO-based personnel are those persons who normally work in Grand Junction. Their exposure records are tracked through the GJO and DOE-Idaho office. Exposure records of the Richland-based personnel are tracked at Hanford.

Before beginning logging at a waste site, the GJO contractor personnel will contact the HSC safety personnel to receive a briefing on the potential hazards/exposures and verify assessed exposures based on information described in the standing AJHA provided by the HSC for working with site monitoring wells. On the basis of past borehole logging experience, it is unlikely that logging engineers will experience significant exposures. In the event observations indicate potential hazards may exist during logging activity, personnel will request support from HSC safety personnel to assess the situation. If a logging engineer or co-worker suspects or becomes convinced that a situation exists that places themselves or others or the environment in danger, they have the authority to stop work, as specified in HNF-PRO-3468, *Stop Work Responsibility*. The employee has the responsibility to immediately notify supervision/management. After notification, resolution of the issue resides with the responsible supervisor.

The HSC monitoring program, as described in site-specific HASPs, should be referred to for entry and specific respiratory protection requirements for a particular waste site. Copies of the site-specific HASPs will be maintained at the worksite.

Radiological surveys for entering or exiting radiological control areas will be performed by the HSC Radiological Control Technicians (RCTs) as required per the applicable RWP. Personnel qualified for self-survey may survey themselves upon exiting a radiological control area upon approval for HSC RadCon.

9.0 Site Control

9.1 Work Coordination

The Project Coordinator will coordinate with HSC personnel to stay abreast of scheduled waste site activities as defined in Section 4.1, "Work Control Requirements," of the *Memorandum of Agreement Between Fluor Hanford, Inc., and S.M Stoller Corporation Regarding the Performance of Geophysical Logging at the Hanford Site*. The Project Coordinator will schedule well logging activities to ensure the GJO contractor personnel are not exposed to any hazards not addressed in this HASP.

9.2 Radiological Work Permits

Work at the individual waste sites may or may not require an RWP. This will be determined by the HSC RadCon organization responsible for the specific waste site. Employees performing work at a site controlled by an RWP will adhere to all requirements listed on the RWP.

9.3 Access Control

Generally, access control will be determined as defined in Section 4.2, "Badging, Site Access, and Work Hours," of the *Memorandum of Agreement Between Fluor Hanford, Inc., and S.M Stoller Corporation Regarding the Performance of Geophysical Logging at the Hanford Site*. Access control to some waste sites containing radiological and chemical hazards is performed by the Access Control Entry System (ACES). Processing through ACES verifies entry requirements for individuals accessing radiologically controlled areas. Once entry requirements are verified, access is permitted and controlled.

Employees entering these areas are required to review the facility radiological status map and respiratory requirements and acknowledge understanding of the entry requirements, which are typically posted at the controlled area access point. In addition, processing through ACES requires identification of the specific RWP regulating the particular scope of work being performed.

9.4 Vehicle Control

Vehicles may exit radiologically controlled waste sites after routine monitoring for contamination. However, these vehicles will remain on the Hanford Site and under the radiological controls of HSC RadCon. Should eventual unconditional release of these trucks be necessary, a more thorough and extensive radiological survey may be required.

9.5 Safe Work Practices

9.5.1 Daily Inspections

The logging truck and equipment will be inspected daily, if the truck/equipment will be operated that day. As a minimum, the inspection will include the tires, brakes, cables, pulleys, and sheaves. Any defects will be fixed prior to commencing logging activities.

9.5.2 Communication

In most instances, a GJO contractor employee may be required to work alone and/or after hours on the Hanford Site. The Project Coordinator will ensure that a two-way radio or cellular phone is available to GJO contractor employees during logging operations at the Hanford Site. A list of current emergency phone numbers will also be posted in Section 2.0, "Key Personnel" of this procedure in each logging truck. The GJO contractor will comply with HNF-RD-11166, *Control of Working Hours and Working Alone*.

9.5.3 Accident Prevention Responsibilities

Only qualified employees, by training or experience, will operate machinery and equipment. All manufacturer guidelines for safe operation, inspection, or repair of equipment will be followed.

Personnel should always be alert for unsafe conditions or environments. Should unforeseen health safety hazards be encountered, HSC and the GJO contractor management will be notified immediately and additional controls will be implemented as necessary.

Every employee is responsible for exercising stop-work authority when observing an act that may result in an imminent life-threatening or hazardous situation.

9.5.4 Eye, Face, and Foot Protection

Employees will wear appropriate eye and face protection equipment when machines or operations present potential eye or face injury from physical or chemical agents, as specified in HNF-RD-11183, *Personal Protection*. Eye and face protection shall be certified and marked by the manufacturer as meeting the requirements of ANSI Standard Z87.1 and Z87.1A (current edition) *Practice for Occupational and Educational Eye and Face Protection*.

Employees will wear safety-related footwear in accordance with HNF-RD-11183, conforming to the specifications of ANSI Z41.1.

Personnel are required by the HSC to don safety glasses with side shields or goggles prior to entering a waste site.

9.5.5 Noise Exposure and Hearing Conservation

The requirements necessary to implement an occupation noise control and hearing conservation program (HCP) are found in HNF-RD-11812, *Occupational Noise Exposure and Hearing Conservation*. It requires that line management shall ensure that workers are not exposed to noise levels at or above 85 dBA time weighted average (TWA). Stoller shall conduct a noise exposure assessment to establish a baseline if such an exposure is suspected or expected. This is in accordance with Occupational Safety and Health Administration (OSHA) Hearing Conservation Standard, 29 CFR 1910.95.

Employees are required to wear suitable hearing protectors per 29 CFR 1910.95 (i)(2).

9.5.6 Electrical

Personnel will ensure electrical equipment is free from hazards likely to cause physical injury or death to themselves or co-workers. All electrical equipment associated with the logging vehicle should be in good working order with no defects and conform to the Electrical Safety Standard 2.7 provided in the *GJO Health and Safety Manual*, GJO 2 (Stoller 2002a) and as directed by the *Logging System Operating Procedures* (GJO-HGLP-1.6.5).

Every employee is responsible for exercising stop-work authority when observing an unsafe electrical hazard.

9.5.7 Unplanned Activities

If an unplanned activity is necessary and requires additional safety requirements, the GJO contractor Project Coordinator will coordinate with HSC to address safety concerns and requirements before work is performed.

9.5.8 Asbestos

GJO contractor personnel will not disturb any material they suspect may contain friable asbestos. Monitoring activities in the vicinity of the material suspected to be or containing friable asbestos will be suspended, and HSC will be notified of the material. Monitoring activities in the vicinity of non-friable asbestos (e.g., unbroken transit piping) will be continued at the discretion of the HSC.

9.5.9 Material Safety Data Sheets

Material Safety Data Sheets (MSDSs) will be maintained in the logging vehicle for all hazardous materials kept on the truck. A set of the MSDSs will be provided to the Fluor GRP Safety Manager. All personnel using these materials will be trained to the MSDS, as necessary, and training records will be maintained.

9.5.10 Liquid Nitrogen

Liquid nitrogen can cause severe frostbite and can cause asphyxiation by displacing oxygen in a confined area. Handlers of this material must familiarize themselves with the MSDS and the handling procedures outlined in the *Logging System Operating Procedures* (GJO-HGLP-1.6.5). All personnel will have proper training and instructions for the specific cryogenic liquid and the storage and distribution system used in the logging system before attempting to make a liquid nitrogen transfer.

Handlers of liquid nitrogen must use the appropriate PPE as defined in Table 3-1.

9.6 Vehicle Movement

Where required, HSC personnel will be contacted prior to initiating logging activities at a waste site to determine specific vehicle movement restrictions. A spotter may be required during vehicle movement at some waste sites. This is essential when backing the logging truck to the well head. Vehicles will not be driven over or parked on a site posted as having a cave-in potential. Before logging activities commence, the logging truck wheels will be chocked (at least one), and the emergency brake set will be set.

9.7 Exclusion Zone

The logging truck will be set up with an exclusion zone established by the use of stanchions and rope to define the zone. If there is need to have the working area zoned off for reasons of RadCon protection, the exclusion zone and the RadCon zone will be one and the same. Signs will be posted on the rope with the words "Caution – Controlled Area – Authorized Personnel Only"

10.0 Decontamination

10.1 Personnel Decontamination

Personnel decontamination will be performed by HSC personnel according to approved HSC procedures. Contamination of personnel is not expected; however, should personnel contamination be detected, the individual will be decontaminated before leaving the waste site. Most contamination can be removed using simple, non-abrasive techniques such as tape presses or soap and water. Decontamination for non-radiological concerns will conform to the site-specific HASP.

10.2 Equipment Decontamination

Equipment decontamination will be performed by HSC personnel according to approved HSC procedures.

11.0 Emergency Response/Contingency Plan

The site-specific training will compliment the information contained in this HASP. GJO contractor personnel will ensure the Hanford Site emergency actions are understood and followed.

11.1 Emergency Contacts and Phone Numbers

The Patrol Operations Center has been designated as the **single point-of-contact** to mobilize responses from support organizations for any emergency whether it is a fire, accident, spill, or otherwise. The single point-of-contact is available at all times (**911 or 373-3800, cellular**) and has the responsibility to initiate notifications as well as to dispatch emergency responders (Hanford Fire Department, Hanford Patrol, and ambulance services).

For non-emergencies, Table 11-1 provides useful phone numbers. The Project Coordinator will ensure Table 11-1 is posted in a conspicuous location in the logging truck.

Table 11-1. Useful Phone Numbers for Non-Emergencies

Position/Agency	Phone Number
Shift Office	373-3475
Patrol Operations Center	911 south of the Wye Barricade; 911 or 373-3800 north of the barricade. NOTE: Cellular users dial 373-3800.
200 West Health Service Center (7:00 AM - 4:00 PM)	373-2714

11.2 Emergency Alarms

The Project Coordinator will ensure that Table 11-2, "Emergency Alarms," is posted in the logging truck. At the activation of an alarm or signal, the listed actions shall be followed. Site-specific HASPs will be reviewed prior to initiating logging activities at a waste site to determine the appropriate staging area and specific actions that must be taken in the event of an emergency.

Table 11-2. Emergency Alarms

Signal	Meaning	Actions to be Taken
Crash alarm telephone (steady ringing phone)	Emergency message	Lift receiver, do not speak, listen to caller and relay message(s) to building occupants and BED of alternate.
Gong or bell and flashing lights	Fire	Evacuate building. Move upwind. Keep clear of emergency vehicles.
Siren (steady blast)	Area evacuation	Proceed promptly to accountability area. Follow instructions.
Wavering (tone) siren	Take cover	Close all exterior doors, turn off all intake ventilation and notify manager of whereabouts. Request call back for status and monitor portable radios.

11.3 Fire Response Procedure

The following steps will be taken when a fire occurs at the project work site:

1. Contact the Patrol Operations Center using the available communications equipment (telephone or radio) and notify them of the situation.
2. Small, localized fires may be handled using the appropriate fire extinguisher to bring the occurrence under control.
3. Large, uncontrolled fires will be handled by the Hanford Fire Department. Evacuate and isolate the area and deny entry to unauthorized personnel.
4. If the fire involves material that could potentially release toxic gases, all persons in the immediate vicinity will be evacuated (sound the evacuation alarm), then the fire department will be notified of the potential toxic gas hazard.

11.4 Notification and Reporting

The employee who discovers the emergency is responsible for immediately reporting the situation by most expeditious means available to the Stoller Project Coordinator. The Stoller Project Coordinator will provide immediate verbal notification followed by written notification of any serious or potentially serious unplanned events and conditions to the FH Field Representative and Single Point of Contact. This notification will be sent to the HSC point of contact for the particular site where the emergency condition occurred. The GJO contractor will comply with the HSC requirements for occurrence reporting as delineated in HNE-PRO-060, *Reporting Occurrences and Processing Operations Information*.

GJO contractor management will be notified promptly (within 1 hour). The Project Coordinator will complete and forward or fax an Incident/Safety Report (GJO Form 1743e) to the Project Safety Office within 1 working day of the event, and provide a copy of the form to the HSC.

Other reports may be required (e.g., personal injuries/illness or automobile accidents) as described in the *GJO Health and Safety Manual*, GJO 2 (Stoller 2002a).

The HSC will be responsible for reporting under the DOE Occurrence Reporting and Processing System (ORPS). The GJO contractor will assist HSC in the development of GJO contractor-related ORPS reports. The GJO contractor will provide qualified personnel to assist in any required investigations.

11.5 Emergency Response Equipment

11.5.1 Communications Equipment

Cellular telephones or two-way radios will be issued to all field personnel for communication with emergency response personnel.

11.5.2 Fire Suppression

The Project Coordinator will ensure that a 10-pound or greater BC-Rated, dry chemical fire extinguisher is available in each logging truck. All portable fire extinguishers shall be tested, inspected, and maintained in accordance with *Fire Protection System Testing/Inspection/Maintenance/Deficiencies* (HNF-RD-7899).

11.5.3 First Aid Kits

First aid kits will be maintained in each support vehicle. The kits will conform to OSHA guidelines provided in Appendix A to 29 CFR 1910.151, "First Aid Kits." All injuries will be reported to the Project Coordinator and the individual will report immediately to the nearest first aid station.

12.0 Confined Space Entry

12.1 Evaluation

No confined space entry is anticipated for the Hanford Geophysical Logging Project.

13.0 Spill Containment

No tasks specific to the Hanford Geophysical Logging Project require controls for spill containment. However, should a spill of any hazardous material (e.g., petroleum products via a leaking gas tank or broken crank case) occur, then personnel should attempt to stop the spill and minimize its extent (e.g., pushing dirt up around the spill to contain it). Immediately notify Patrol Operations Center at 373-3800 and the Project Coordinator. Contact HSC to provide assistance for spill clean up and proper disposal. The logging trucks will be equipped with a small spill kit, such as absorbent pads.

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Appendix A
Fluor Hanford Inc., Exposure Assessment Plan for
S.M. Stoller Corporation Well Logging Activities

1.0 Purpose

This document provides guidelines for Fluor Hanford's (FH) Groundwater Remediation Project's (GRP) Occupational Safety and Health (OS&H) organization to conduct industrial hygiene monitoring and sampling during well-logging activities performed by S.M. Stoller Corporation. Monitoring will be performed as necessary to determine airborne concentrations of the chemical contents of wells that may exceed the applicable FH occupational exposure limit or that may present a health or safety hazard. As deemed necessary, monitoring may also be performed for other hazards such as noise and heat stress.

Well-logging activities will be performed at a number of wells located in various portions of the Hanford site. The contaminants of concern have not been tabulated at individual wells for this logging activity. Based on previous experience it will be assumed that the chemical constituents at each well may include volatile chlorinated and volatile non-chlorinated hydrocarbon compounds.

Semi-volatile organic compounds, inorganic compounds and/or metals may also be present in the wells. Based on previous experience it will be assumed that volatile organic compounds will be present if any other contaminants of concern are also present. The industrial hygienist will evaluate any situation in which venting is noted at any well but no volatile organic compounds are detected by field instruments.

2.0 Scope

This document applies only to sampling and monitoring performed to support well-logging activities. This document does not address environmental sampling or monitoring for radiological hazards.

3.0 Responsibilities

Monitoring personnel shall:

- Ensure all monitoring equipment calibration is current,
- Ensure all monitoring equipment is field checked as required by the manufacturer's specifications and this document,
- Perform the necessary monitoring,
- Ensure the results of field checks, monitoring, sampling and analysis are recorded on the appropriate forms, and
- Advise affected on-site personnel of the results at the time of the monitoring and report the results in accordance with HNF-PRO-409.

4.0 Precautions and Limitations

Personnel designated by the GRP Occupational Safety and Health (OS&H) Manager and qualified in the operation of sampling equipment and direct reading monitors perform or oversee the sampling and monitoring work. Monitoring may be performed only by the designated and qualified personnel.

Personnel protective equipment (PPE) requirements will be evaluated before sampling or monitoring.

Note: The GRP OS&H Manager or the GRP industrial hygienist may authorize additional or other methods or alternatives to the methods in this procedure.

5.0 Required Materials and Instruments

The industrial hygiene monitoring instruments will be selected by the OS&H personnel on the basis of available information. This may include well or waste profiles, other documents supporting this work, documents supporting other work that contain useful information, and/or experience performing this and similar work in the past. The monitoring will be performed with one or more of the following:

- A photo-ionization detector equipped with either a 10.6 ev lamp or an 11.7 ev lamp,
- Personal volatile organic monitors (ToxiRae or equivalent),
- A flame ionization detector,
- An explosimeter,
- A carbon dioxide monitor,
- A carbon monoxide monitor,
- An ammonia monitor,
- A mercury monitor,
- A sulfur dioxide monitor,
- An infrared detector,
- Color-stain tubes,
- Tedlar ® bags (or equivalent),
- Summa ® canisters (or equivalent),
- Sampling media as specified in appropriate National Institute of Occupational Safety and Health (NIOSH) analytical methods,
- Personal dosimetry badges (e.g. 3M passive dosimeters), or
- Colorimetric badges.

6.0 Determination of the Presence of Organic Contaminants of Concern

The work zone and/or the breathing zone will be monitored and/or sampled to determine the presence (if any) of organic contaminants of concern. It is anticipated that photo-ionization detectors will be the most commonly used instruments. Monitoring or sampling will be performed on the personnel suspected to be the most highly exposed (“worst case”) and/or typical (“representative”) exposures. Monitoring shall be performed as follows:

- Daily, prior to beginning of work and as soon as possible after the well cap has been removed,
- When barometric changes occur that may significantly increase the venting from wells,
- When any unforeseen changes are noted (*e.g.*, visible plumes noted or noticeable odors), and
- Upon request.

Sample collection and analysis will be determined by the GRP industrial hygienist. Area samples, personnel samples, and/or source samples may be collected and analyzed.

All potential exposures will be avoided if possible. The industrial hygienist will determine the extent to which unavoidable low-level irregular or isolated exposures may be tolerated. Where it is known (or can reasonably be assumed) that only one contaminant is present, the action level will be no greater than half of the applicable FH occupational exposure limit.

If no contaminants are detected at the top of the well casing and if no contradicting information is noted it will be assumed that the personnel breathing zones are free of contaminants. If contaminants are detected at the source the breathing zones and/or work stations will be checked to confirm that no contaminants are present, or if contaminants are present, what actions must be taken to reduce or eliminate the exposures. The personnel present and project management will be advised if actions are necessary to reduce or eliminate exposures.

7.0 Records

All records generated during this work shall be maintained and retained in accordance with applicable GRP and FH requirements.

8.0 Worker Involvement

Each employee is ultimately responsible for his or her own personal safety and that of his or her co-workers. Employees shall promptly report any changes or discrepancies noted that may indicate a potential exposure. If such changes are noted:

- Pause/stop work activities in a safe manner,
- Remove all affected employees to a safe location crosswind or upwind away from the well,
- Notify project management and GRP OS&H of the circumstances, and
- Do not return to work until cleared by GRP OS&H.

GRP OS&H will evaluate the situation and determine a path forward.